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A survey of the Siberian erigonine genus *Perlongipalpus* (Aranei: Linyphiidae: Erigoninae) with description of two new species

Обзор пауков-эригонин сибирского рода *Perlongipalpus* (Aranei: Linyphiidae: Erigoninae) с описанием двух новых видов

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KEY WORDS: East Palaearctic, spiders, Erigoninae, new species.
КЛЮЧЕВЫЕ СЛОВА: Восточная Палеарктика, пауки, Erigoninae, новый вид.

ABSTRACT. The Siberian spider genus *Perlongipalpus* Eskov & Marusik, 1991, encompasses four species: *P. mannilai* Eskov & Marusik, 1991 (East Siberia); *P. pinipumilis* Eskov & Marusik, 1991 (type-species, from Transbaikalia to the upper Kolyma); *P. saaristoi* sp.n. (Tuva); and *P. mongolicus* sp.n. (Mongolia). All species are redescribed or described, illustrated and diagnosed. Distribution of all species is mapped.

РЕЗЮМЕ. Обзор пауков сибирского рода *Perlongipalpus* Eskov & Marusik, 1991 показал, что таксон включает 4 вида: *P. mannilai* Eskov & Marusik, 1991 (Северо-восток Сибири), *P. pinipumilis* Eskov & Marusik, 1991 (типовой вид, от Забайкалья до верховий Колымы), *P. saaristoi* sp.n. (Тува) и *P. mongolicus* sp.n. из Монголии. Все виды переописаны или описаны, детально проиллюстрированы. Для всех видов даны диагнозы. Показаны точки находок всех видов.

Introduction

This paper is the sixth in a series of our surveys of the Holarctic erigonines [Saaristo, Marusik, 2004; Marusik et al., 2006, 2007a, b, 2008]. *Perlongipalpus* was described on the basis of two new species from East Siberia [Eskov & Marusik, 1991]. Since then it was mentioned in several faunistic papers, chiefly from Magadan Area [Marusik et al., 1992; Marusik, 1993, 2005]. Outside of east Siberia this genus was reported from Mongolia [Wunderlich, 1995], northern Transbaikalia [Marusik et al., 2001], northern Cisamuria [Tanasevitch, 2006] and Tuva [Logunov et al., 1998; Marusik et al., 2000]. Mongolian specimens were identified as *P. pinipumilis* Eskov & Marusik, 1991, and the Tuvan species as *P.* cf. *pinipumilis*. Brief comparison of the Tuvan population with topotype material reveals that they are not conspecific, although are congeneric. Because of the finding of a new species in Tuva, and another in Mongolia, and because the original descriptions are not satisfactory, we decided to survey all the species of this genus, and to provide the first SEM illustrations for *Perlongipalpus*.

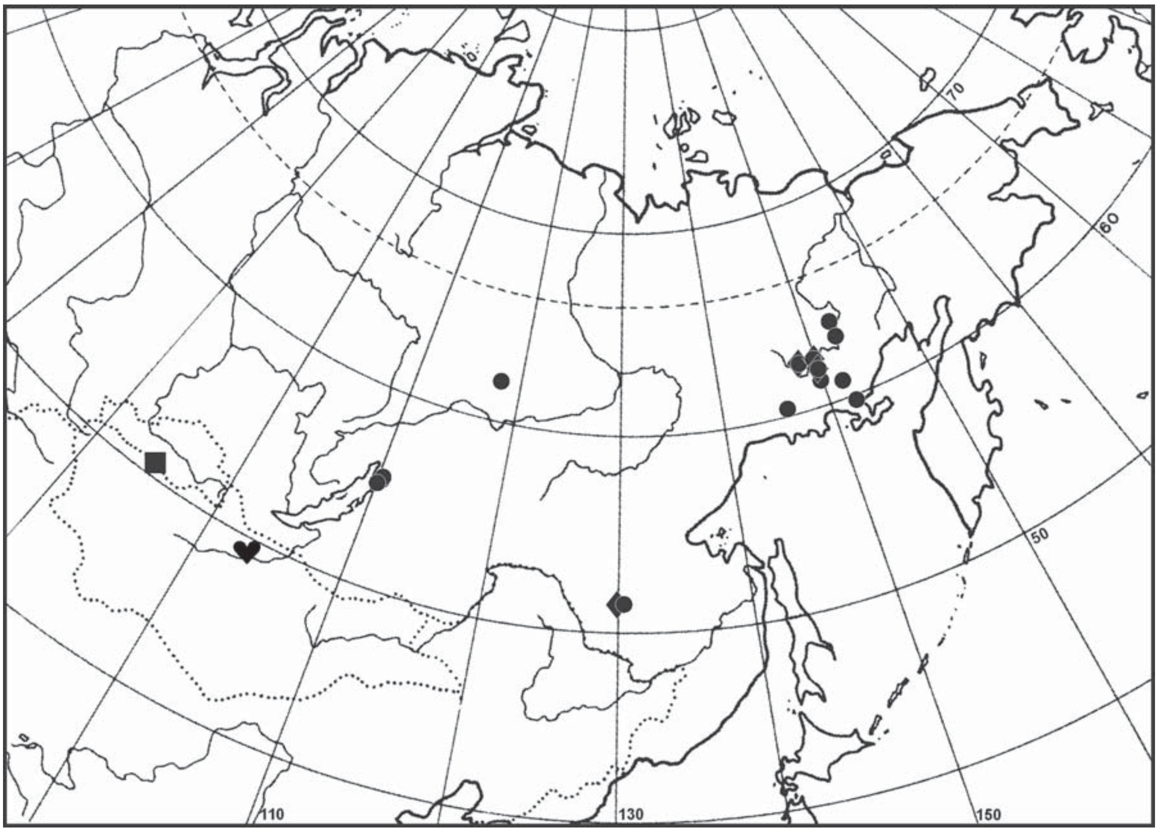
Material and methods

Material treated herein is shared between collections of Institute for Biological Problems of the North, Magadan (IBPN), Zoological Museum, University of Turku (ZMUT), Zoological Museum of the Moscow State University (ZMMU), Termeszettudomanyi Museum, Budapest (TMB) and Senckenberg-Museum, Frankfurt am Main (SMF). In section "Material studied" we list only the material that is used for this study, and material studied earlier is mentioned in the text.

Descriptions of *P. mannilai* and *P. pinipumilis* are based on the paper by Eskov and Marusik [1991], and they include additional details about the structure of the palp. Following abbreviations are used in the text: AME — anterior median eyes, ALE — anterior lateral eyes and ED — embolic division.

Illustrations were made using transmitted light microscope with drawing "devices". SEM-microphotographs were made with a JEOL JSM-5200 in the Zoological Museum, University of Turku. All measurements are given in mm.

Following abbreviations are used in the figures: *ALE* — anterior lateral eyes; *AME* — anterior median eyes; *Et* — AME tubercle; *Me* — embolic membrane; *Pr* — protegulum; *Ss* — strong spines; *St* — suprategulum; *Ta* — tibial apophysis; *Te* — terminal apophysis; *Tl* — tegular lobe; *To* — outgrowth of the terminal apophysis; *Tr* — trichobothrium; *Ts* — tegular sac; *Wm* — whip-like macrosetae.



Map 1. Distribution of *Perlongipalpus* species: square — *P. saaristoi* sp.n., diamond — *P. mannilai*, dot — *P. pinipumilis*, heart — *P. mongolicus* sp.n.

Карта 1. Распространение пауков рода *Perlongipalpus*: квадрат — *P. saaristoi* sp.n., ромб — *P. mannilai*, кружок — *P. pinipumilis*, сердечко — *P. mongolicus* sp.n.

Perlongipalpus Eskov & Marusik, 1991

Type species: *Perlongipalpus pinipumilis* Eskov & Marusik, 1991 from the upper Kolyma.

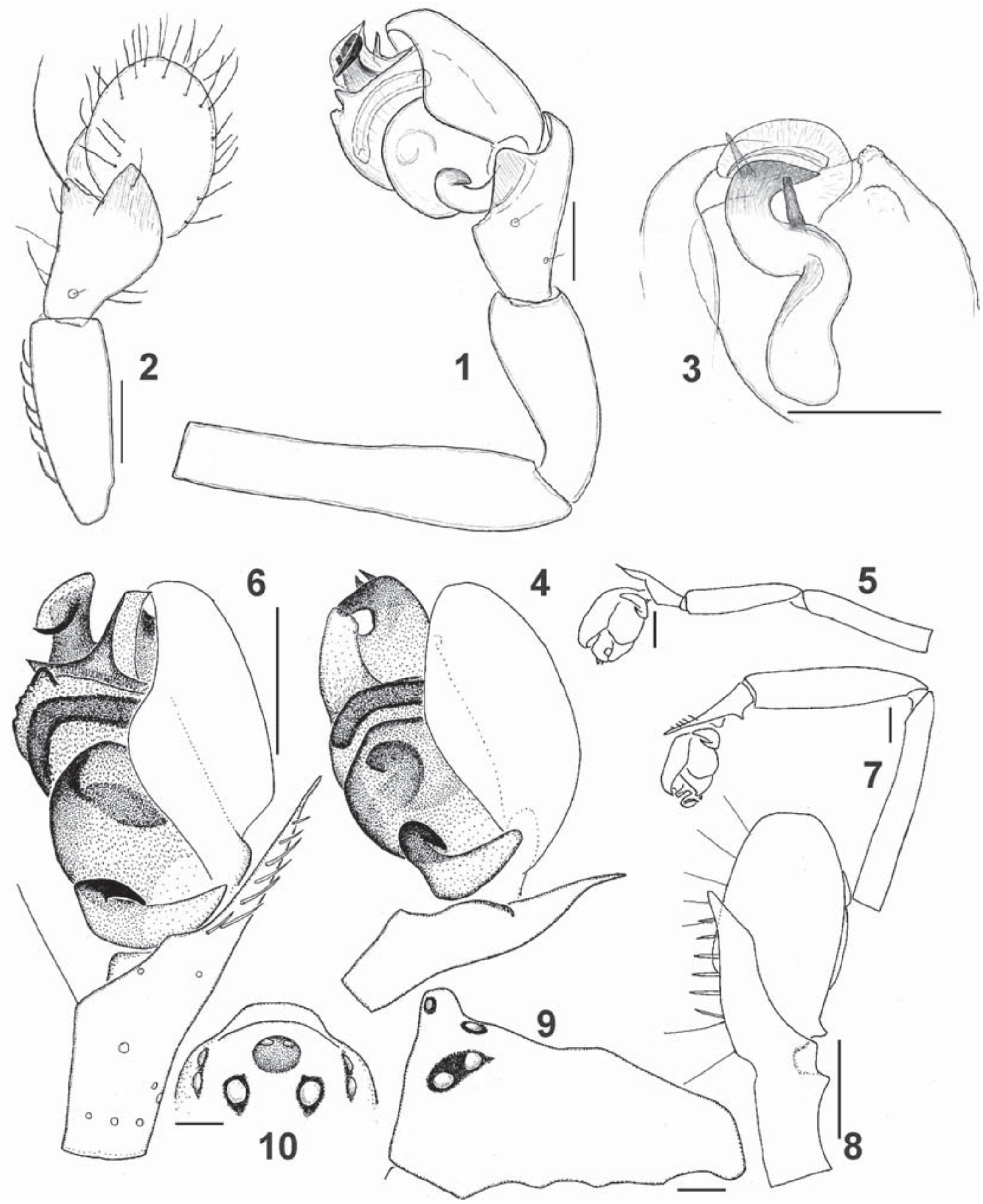
DESCRIPTION. Small sized, dark colored erigonines. Tibial spines 2221. TmI 0.6–0.79. Tm IV absent. Chelicera with five promarginal teeth. Male carapace modified in *P. mannilai* and unmodified in other species. AME placed higher than lateral eyes (except in *P. saaristoi* sp.n.) Chelicera unmodified. Male palp very long, 1.3–1.8 times longer than carapace. Patella much longer than tibia. Tibia with elongate dorsal apophysis, and more or less developed lateral lobe placed near paracymbium. Although Eskov & Marusik [1991] wrote that the palpal tibia has one trichobothrium, in fact it has two or three (Figs 25–26). Tibial apophysis in two species, *P. pinipumilis* and P. *mannilai*, with series of strong and short setae (Figs 25–26, 33–37). *P. mannilai* has several very long whip-shaped setae on tibia and on the apex of tibial apophysis (Fig. 33). Cymbium unmodified, although with strong setae, paracymbium small and simple with hook-like hairless tip. Tegulum with small or large protegulum and small tegular sac. Embolic division (ED) S-shaped, with one terminal apophysis. In *P. mannilai* and *P. pinipumilis* terminal apophysis bears one or two outgrowth. Embolic membrane large, embolus proper relatively short and stays along the axis of ED and terminal apophysis skirts it. Epigyne flat, with trapezoidal median plate, opening trapezoidal if present. Vulva with large receptacula and short insemination ducts.

COMPOSITION. Four species: *P. pinipumilis* Eskov & Marusik, 1991, *P. mannilai* Eskov & Marusik, 1991, *P. saaristoi* sp.n. and *P. mongolicus* sp.n.

INTERRELATIONSHIPS. Three species of this genus, *P. pinipumilis, P. mannilai* and *P. mongolicus* sp.n., are rather close to each other by having modified male carapace, palpal patella subequal in length to femur, presence of thick and short setae on tibia, presence of outgrowth on terminal apophysis and distinct epigynal fovea. P. *saaristoi* sp.n. stays somewhat apart, although it has the same type of ED, enlarged and thickened palpal patella, elongate palp, very similar paracymbium.

RELATIONSHIPS. Eskov and Marusik [1991] placed *Perlongipalpus* near *Eboria* Falconer, 1910 (=*Semljicola* Strand, 1906) and *Connithorax* Eskov, 1993. M. Saaristo (personal communication) supported the idea of the close relationships of *Perlongipalpus* and *Semljicola*. Judging from the shape of ED: straight embolus-proper and terminal apophysis skirting embolus *Perlongipalpus* is more similar to *Diplocentria,* a member of *Leptorhoptrum*/*Lophomma* group of genera, than it is to *Semljicola* or *Connithorax,* members of *Tapinocyba* group of genera. We can not say with certainty to which group of Erigonines [sensu Millidge, 1977] *Perlongipalpus* belongs (to *Leptorhoptrum*/*Lophomma* or to *Tapinocyba*).

DISTRIBUTION. This genus is known from Tuva and Mongolia to northeastern Siberia. It seems that it has a disjunction between Tuva and West Yakutia, and between west Yakutia and Kolyma River basin (cf. Map 1).



Figs 1–10. Males of *Perlongipalpus saaristoi* sp.n. (1–3), *P. pinipumilis* (4–5) and *P. mannilai* (6–10): 1, 4, 5–7 — palp, lateral; 2, 8 — palp, dorsal; 3 — palp, prolateral-ventral; 9 — carapace, lateral; 10 — ocular area, dorsal. 6–10 after Eskov & Marusik [1991]. Scale: 0.1 mm.

Рис. 1–10. Самцы *Perlongipalpus saaristoi* sp.n. (1–3), *P. pinipumilis* (4–5) и *P. mannilai* (6–10): 1, 4, 5–7 — пальпа сбоку; 2, 8 — пальпа сверху; 3 — пальпа, сбоку-снизу; 9 — карапакс, сбоку; 10 — глазное поле сверху. 6–10 по Eskov & Marusik [1991]. Масштаб: 0,1 мм.

Perlongipalpus saaristoi Marusik & Koponen, **sp.n.**
Figs 1–3, 11–15, 31–32, 41–42.

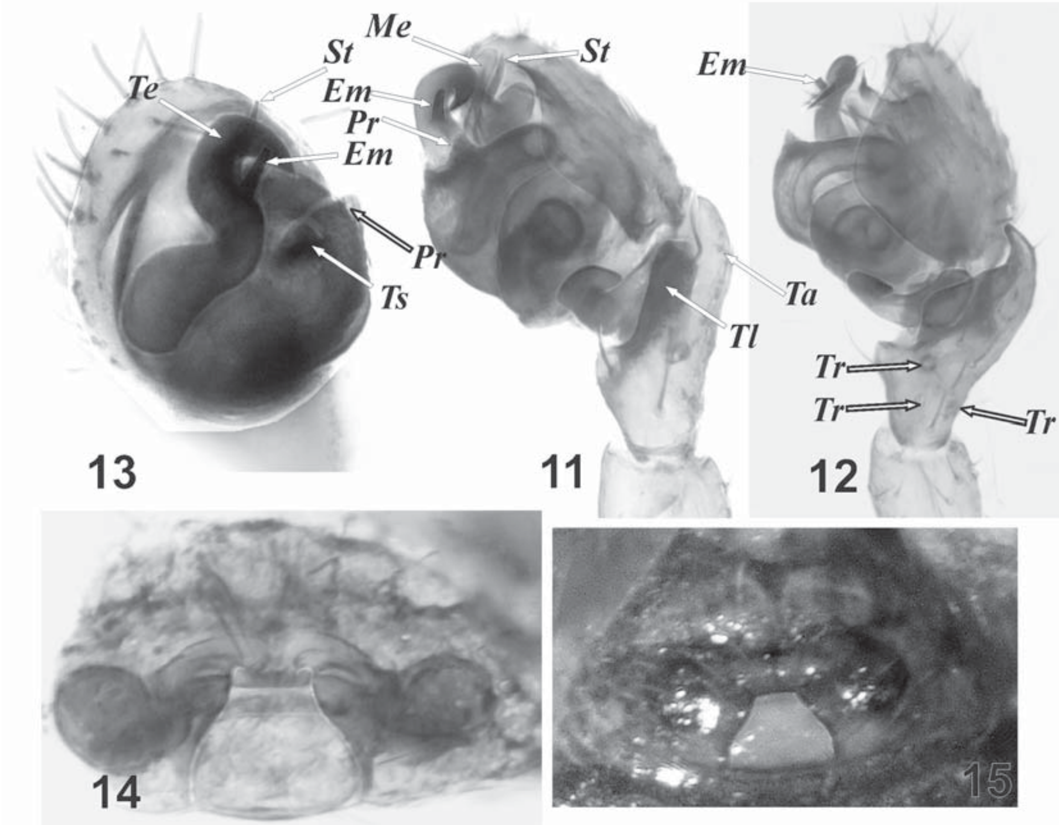
Perlongipalpus sp. 1 (*cf. pinipumilis*): Logunov et al., 1998: 136.
Perlongipalpus sp. 1: Marusik et al., 2000: 63.

MATERIAL. Holotype ♂ (ZMMU) and paratypes 27 ♀♀ (ZMMU, IBPN, ZMUT), RUSSIA, SE *Tuva*, east Tannu-Ola Mt Range, Aryskannyg-Khem River canyon, 50°45'N 94°29'E, 1250–1350 m, 16–18.06.1995 (Yu.M.Marusik)

ETYMOLOGY. The new species is named after our late friend and colleague, Michael I. Saaristo, who has made great contributions in study of linyphiid spiders.

MEASUREMENTS (♂/♀). Total length 1.77/1.7–1.93. Carapace: 0.79/0.77–0.81 long, 0.6/0.56 wide. TmI ♂ 0.77, ♀ 0.78–0.79.

DESCRIPTION. Carapace gray-brownish with pattern, sternum dark brown, abdomen from grayish to dark dray. Male carapace unmodified, clypeus not high, AME placed



Figs 11–15. Digital photographs of *Perlongipalpus saaristoi* sp.n.: 11–12 — palp, retrolateral, different angles; 13 — palp, ventral; 14–15 — epigyne, ventral. 14 — after maceration. Abbreviations: *Me* — embolic membrane, *Pr* — protegulum, *St* — suprategulum, *Ta* — tibial apophysis, *Tl* — tegular lobe *Tr* — trichobothrium, *Ts* — tegular sac.

Рис. 11–15. Фотографии *Perlongipalpus saaristoi* sp.n.: 11–12 — пальпа, ретролатерально по разным углом; 13 — пальпа, снизу; 14–15 — эпигина снизу. 14 — после мацерации. Сокращения: *Me* — мембрана эмболюса, *Pr* — протегулюм, *St* — супратегулюм, *Ta* — отросток голени, *Tl* — вырост тегулюма, *Tr* — трихоботрия, *Ts* — мешок тегулюма.

on the level of ALE. Legs yellow. Palp as in Figs 1–3, 11–13, 1.03 long, patella half as long as femur, tibia with three trichobothria, tibial apophysis relatively short, tibial lobe well developed and partly hides base of paracymbium, tibia without strong (thickened) setae. Protegulum subequal in size to the tegular sac. ED S-shaped, embolus straight and relatively thick, terminal apophysis without distinct outgrowths. Epigyne as in Figs 14–15, 41–42, without distinct opening, median plate trapezoidal with rounded sides, insemination openings placed above the upper part of the median plate.

DIAGNOSIS. Both sexes can be distinguished from three congeners by the position of TmI: 0.77–0.79 (around 0.6 in other species). Males of new species have much shorter palp, relatively short dorsal tibial apophysis which is not so sharply pointed as in other congeners, and large lateral lobe. Females without distinct fovea as in other congeners.

DISTRIBUTION. Type locality only.

Perlongipalpus pinipumilis Eskov & Marusik, 1991
Figs 4–5, 18–19, 22–25, 29–30, 37–40.

P. p. Eskov & Marusik, 1991: 238, f. 1–3, 12–13 (♂♀).

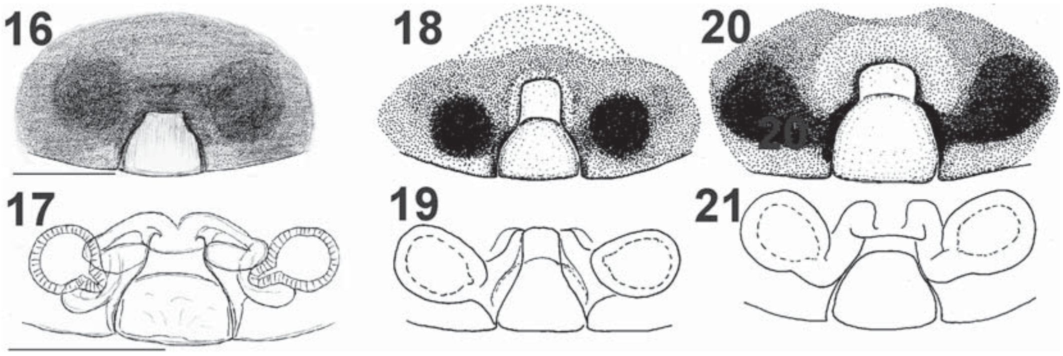
MATERIAL. RUSSIA: *Buryatia*: 1 ♂, 3 ♀♀ (ZMUT), Barguzin Range, Olso River, 54°52'N, 110°55'E, 950 m, litter, 5.07.1996 (S.Koponen). 1 ♀ (ZMUT), Barguzin Range, Olso River, 54°52'N, 110°55'E, 900 m, taiga, 4.–7.07.1996 (S.Koponen). *Magadan* Area: 2 ♂♂ (ZMUT), Kolyma River upper flow, Kontakt Field Station, 61°51'N 147°40'E, 850 m, 9.08.2002 (Yu.M.Marusik). 2 ♂♂, 1 ♀ (IBPN), Lankovaya River (152°E, 59°45'N), Ola River basin, 12–19.08.1992 (Yu.M.Marusik).

MEASUREMENTS. Total length (♂/♀) 1.3–1.43/1.38–1.45. Carapace: 0.53–0.58/0.58–0.63 long, 0.4–0.43/0.4–0.43 wide.

DESCRIPTION. Carapace grayish-brown. Clypeus high in male, AME placed higher than ALE (Figs 22–23, 29–30). Abdomen dark gray. Male palp as in Figs 4–5, 25, 37–40. Pedipalp longer than carapace, tibia with two trichobothria, retromarginal side with four strong and short setae. Tibial apophysis long and sharply pointed, tibial lobe undeveloped. Cymbium covered with long and strong setae. Paracymbial base with two setae. Protegulum large, suprategular apophysis and embolic membrane hides embolic division in retrolateral view. Terminal apophysis (*Te*) of ED blunt on the tip (Fig. 40) with one outgrowth on the level of embolic tip (Figs 39–40). Epigyne as in Figs 18–19, with distinct opening, which is as long as wide.

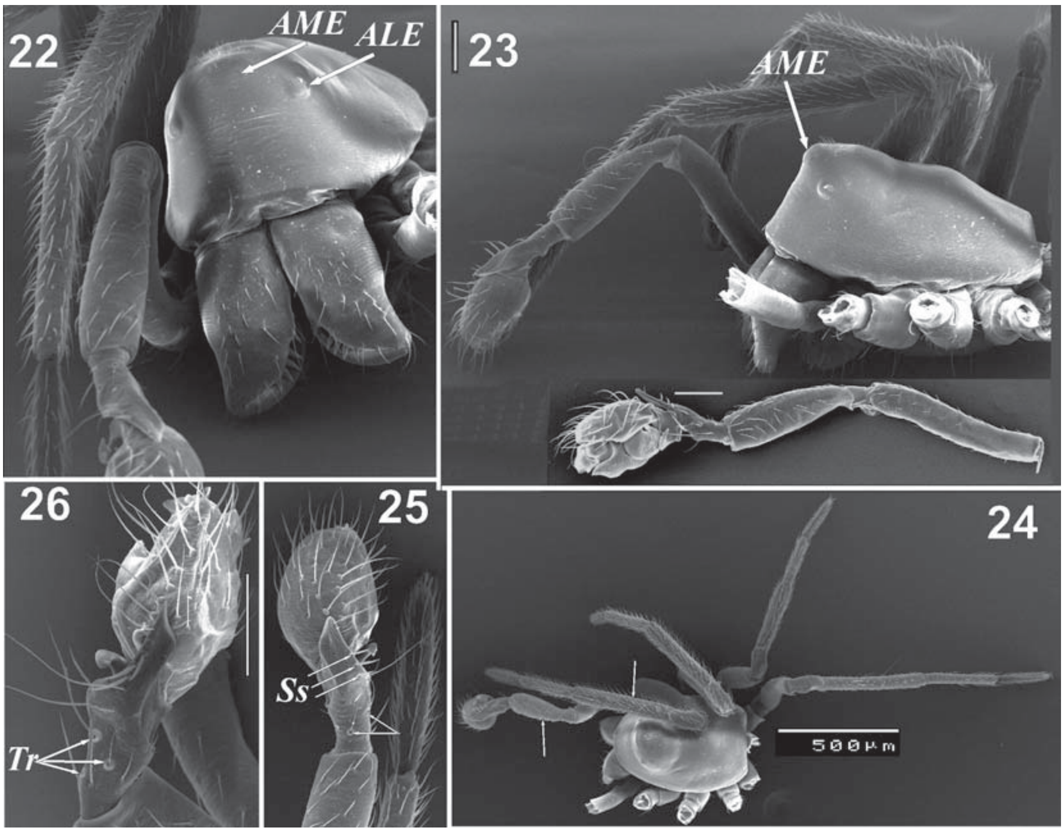
DIAGNOSIS. Most similar to *P. mongolicus* sp.n. (Fig. 46) from which can be distinguished by the shape of epigyne (Figs 18–19) and steep clypeus (Fig. 22 vs 45).

DISTRIBUTION. It has east Siberian range and occurs from northern Transbaikalia to Kolyma River middle flow (ca 153°E) [Eskov & Marusik, 1991; Marusik et al., 1992;



Figs 16–21. Epigyne of *Perlongipalpus saaristoi* sp.n. (16–17), *P. pinipumilis* (18–19) and *P. mannilai* (20–21): 16, 18, 20 — ventral; 17, 19, 21 — dorsal. 18–21 after Eskov & Marusik [1991]. Scale: 0.1 mm.

Рис. 16–21. Эпигина *Perlongipalpus saaristoi* sp.n. (16–17), *P. pinipumilis* (18–19) и *P. mannilai* (20–21): 16, 18, 20 — снизу; 17, 19, 21 — сверху. 18–21 по Eskov & Marusik [1991]. Масштаб: 0,1 мм.

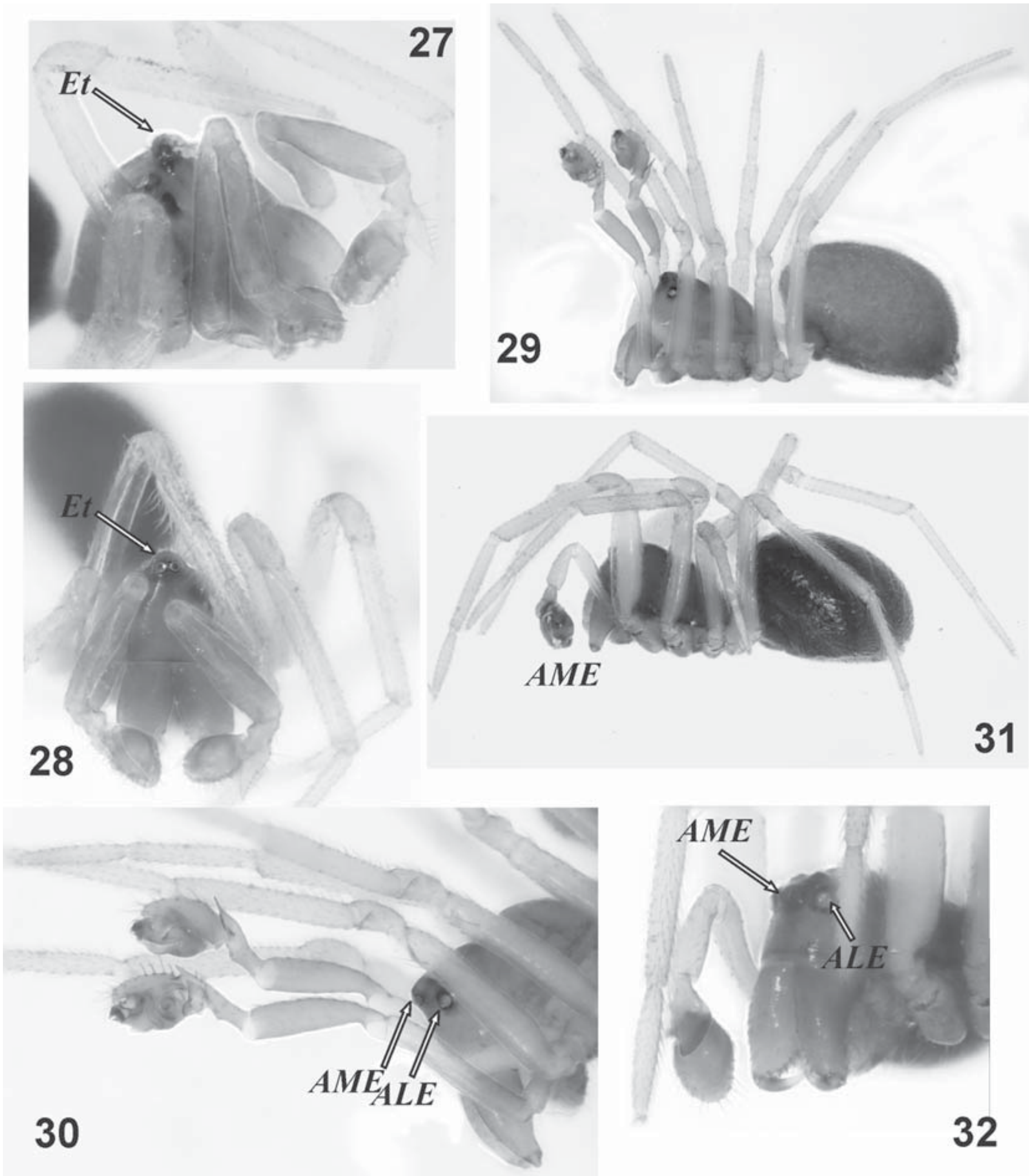


Figs 22–26. Males of *Perlongipalpus pinipumilis* (22–25) and *P. mannilai* (26): 22–24 — carapace, frontal, lateral and dorsal view respectively; 23 — shows relative length of carapace and palp; 25–26 — palp, dorsal view. 26 — cymbium shrunken after drying. Scale: 0.1 mm if not otherwise indicated. Abbreviations: *ALE* — anterior lateral eyes, *AME* — anterior median eyes, *Ss* — strong spines, *St* — suprategulum, *Tr* — trichobothrium.

Рис. 22–26. Самцы *Perlongipalpus pinipumilis* (22–25) и *P. mannilai* (26): 22–24 — карапакс, спереди, сбоку и сверху соответственно; 23 — показана относительная длина карапакса и пальпы; 25–26 — пальпа сверху. 26 — цимбиум сморщен из за подсыхания пальпы. Масштаб: 0,1 мм если не указано иначе. Сокращения: *ALE* — передние латеральные глаза, *AME* — передние медиальные глаза, *Ss* — мощные шипы, *St* — супратегулюм, *Tr* — трихоботрия.

Marusik, 2005] and south to Norski Reserve in Amur Area [Tanasevitch, 2006]. Record of this species from Mongolia [Wunderlich, 1995] refers to another species described here as *P. mongolicus* sp.n.

HABITATS. Most of specimens in Magadan Area were collected in *Pinus pumila* thickets in litter, in Buryatia in litter of taiga forest; in Amur Area in leaf litter in larch forest with sparsely growing alders [Tanasevitch, 2006].



Figs 27–32. Habitus of *Perlongipalpus mannilai* (27–28), *P. pinipumilis* (29–30) and *P. saaristoi* sp.n. (31–32): 27–28 — sublateral and frontal respectively, showing way of folding long palps and tubercle of AME; 29–32 — lateral. Abbreviations: *ALE* — anterior lateral eyes, *AME* — anterior median eyes, *Et* — AME tubercle.

Рис. 27–32. Внешний вид самцов *Perlongipalpus mannilai* (27–28), *P. pinipumilis* (29–30) и *P. saaristoi* sp.n. (31–32): 27–28 — полусбоку и спереди, показано как складываются длинные пальпы; 29–32 — сбоку. Сокращения: *ALE* — передние латеральные глаза, *AME* — передние медиальные глаза, *Et* — бугорок AME.

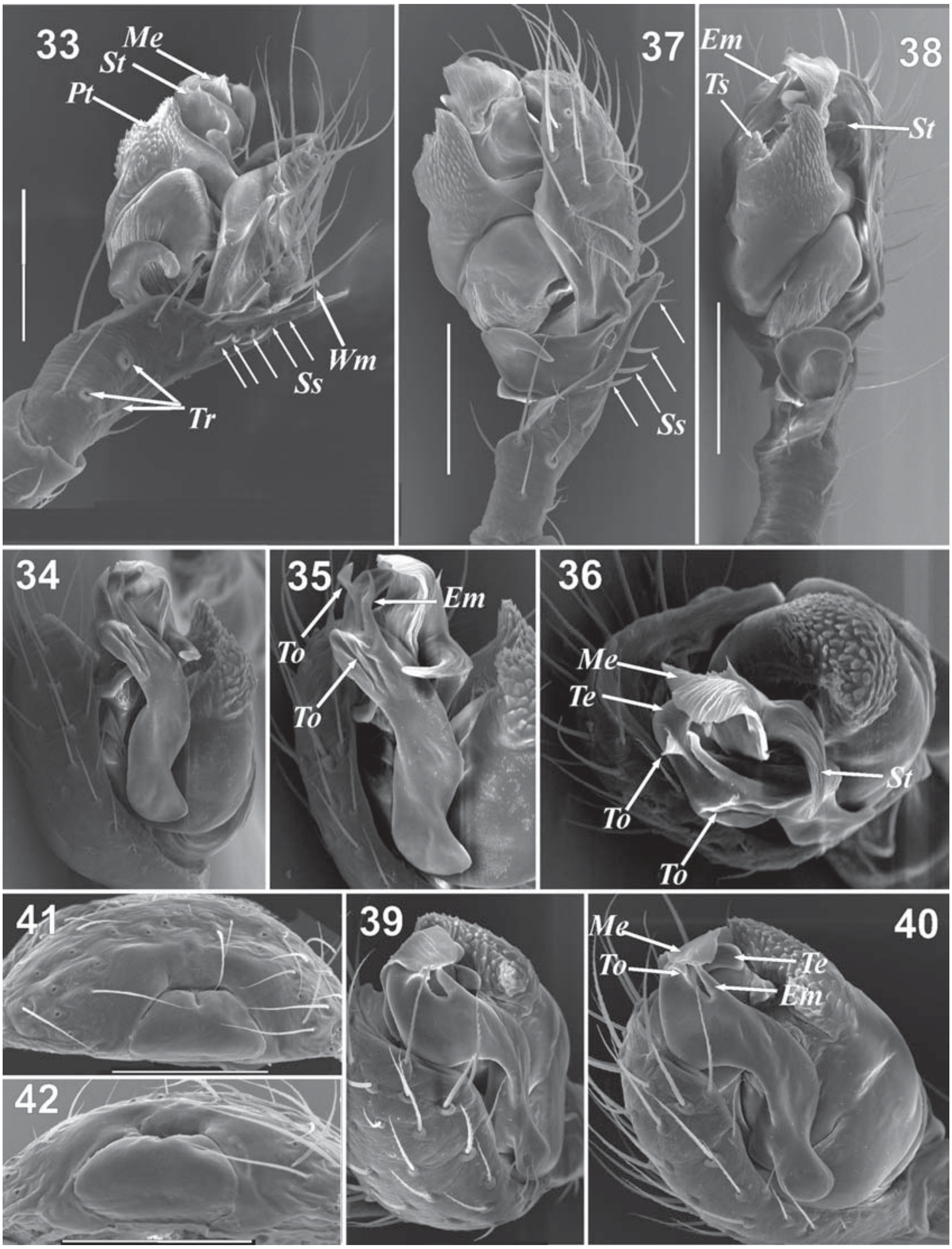
Perlongipalpus mannilai Eskov & Marusik, 1991
Figs 6–10, 20–21, 26–28, 33–36.

P. m. Eskov & Marusik, 1991: 239, f. 4–11 (♂♀).

MATERIAL. RUSSIA: *Magadan* Area: 1 ♂ (ZMUT), Kolyma River upper flow, Aborigen Field Station, 61.9ºN, 149.5ºN, 650 m, Summer 1987 (Yu.M. Marusik).

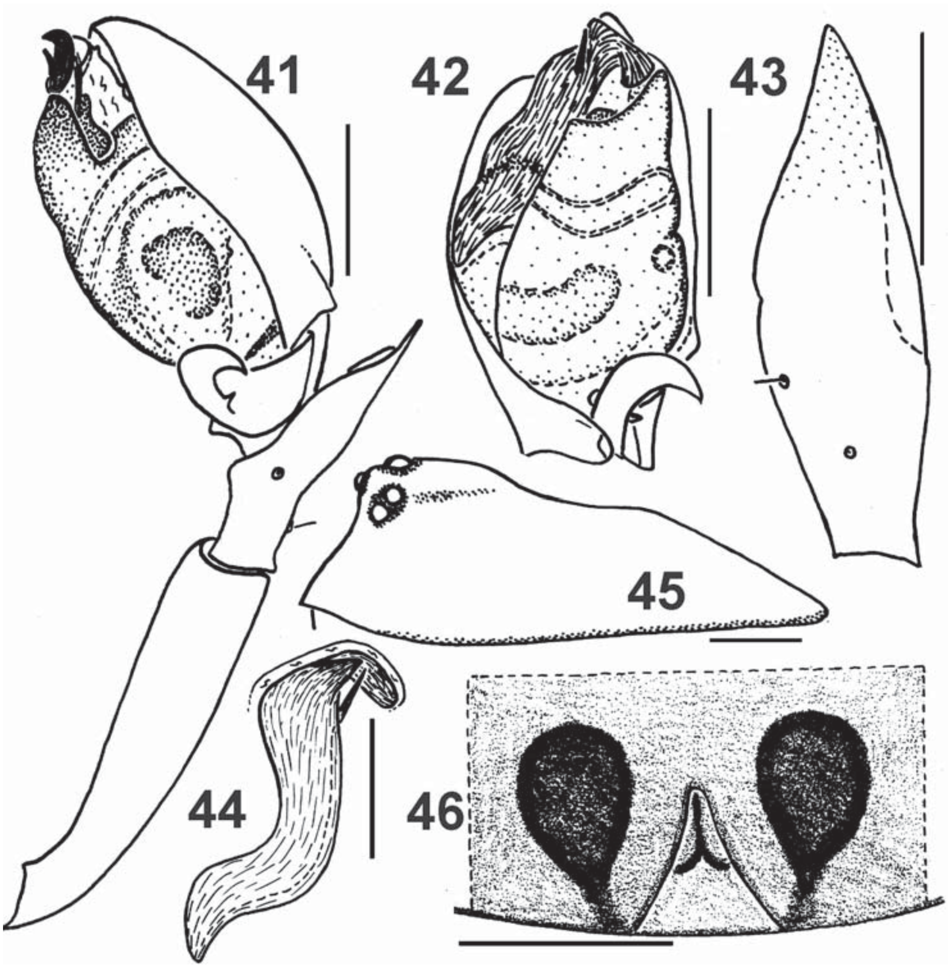
MEASUREMENTS. Total length (♂/♀) 1.63–1.7/1.68–1.78. Carapace: 0.70–0.73/0.7–0.78 long, 0.5–0.53/0.48–0.53 wide.

DESCRIPTION. Carapace grayish-brown. Clypeus high, AME placed on own tubercle in male (Figs 9–10, 27–28). Abdomen dark gray. Male palp as in Figs 6–8, 26–28, 33–36. Pedipalp is 1.8 times longer than carapace, in resting position palp folds in 3-dimensional Z (Figs 27–28); palpal patella equals diameter of Tibia I or is thicker, patella much longer that tibia, tibia with three trichobothria (Figs 26, 33), and several very long whip-like macrosetae (*Wm*), retrolateral edge with five strong and short setae (*Ss*). Tibial apophysis long and sharply pointed. Tibial lobe slightly developed. Cymbium with strong and long setae. Protegulum small, tegular sac undeveloped. ED with sharply pointed and slightly curved embolus-proper, terminal apophysis (*Te*) with two outgrowths. Epigyne as in Figs 20–21. Epigynal opening wider then long.



Figs 33–42. *Perlongipalpus mannilai* (33–36), *P. pinipumilis* (37–40) and *P. saaristoi* sp.n. (41–42): 33, 37 — palp, retrolateral; 34–35, 39–40 — palp, prolateral; 36 — palp, from above; 38 — palp, ventral; 41–42 — epigyne, ventral and caudal, respectively. Scale: 0.1 mm. Abbreviations: *Me* — embolic membrane, *Pr* — protegulum, *Ss* — strong spines, *St* — suprategulum, *To* — outgrowth of the terminal apophysis, *Te* — terminal apophysis, *Tr* — trichobothrium, *Ts* — tegular sac, *Wm* — whip-like macrosetae.

Рис. 33–42. *Perlongipalpus mannilai* (33–36), *P. pinipumilis* (37–40) и *P. saaristoi* sp.n. (41–42): 33, 37 — пальпа, ретролатерально; 34–35, 39–40 — пальпа, пролатерально; 36 — пальпа, сверху; 38 — пальпа, вентрально; 41–42 — эпигина, снизу и сзади, соответственно. Масштаб: 0,1 мм. Сокращения: *Me* — мембрана эмболюса, *Pr* — протегулюм, *Ss* — мощные шипы, *St* — супратегулюм, *To* — вырост терминального отростка, *Te* — терминальный отросток, *Tr* — трихоботрия, *Ts* — мешок тегулюма, *Wm* — жгутовидная щетинка.



Figs 43–48. *Perlongipalpus mongolicus* sp.n.: 43–44 — male palp, retrolateral and ventral; 45 — palpal tibia, dorsal; 46 — embolic division; 47 — carapace, lateral; 48 — epigyne, ventral. Scale: 0.1 mm.

Рис. 43–48. *Perlongipalpus mongolicus* sp.n.: 43–44 — пальпа самца, ретролатерально и вентрально; 45 — голень пальпы, сверху; 46 — эмболюсный отдел; 47 — карапакс, сбоку; 48 — эпигина, сниз. Масштаб: 0,1 мм.

DIAGNOSIS. Similar to *P. pinipumilis* and *P. mongolicus* sp.n. from which can be distinguished by the larger size, having AME ocular tubercle in male, small protegulum, presence of three trichobothria, and a short epigynal opening. It has also very long whip-like macrosetae on tibia. These are absent in other congeners, and *P. mannilai* has more strong (five) and short setae on tibia.

DISTRIBUTION. It has north-east Siberian range and was found in three localities in the upper reaches of Kolyma River [Eskov & Marusik, 1991; Marusik et al., 1992] and north part of Amur Area in Norski Reserve [Tanasevitch, 2006].

HABITATS. About a dozen specimens have been found in subgoltsy (between forest and mountain tundra) zone in Aborigen and Kontakt Field Stations environs under stones. In Amur Area, Norski Reserve it was found in very different habitat among moss and leaf litter in mixed *Picea-Betula* and *Populus-Larix-Betula-Alnus* forests [Tanasevitch, 2006].

Perlongipalpus mongolicus Marusik & Koponen, **sp.n.** Figs 43–48.

Perlongipalpus pinipumilis: Wunderlich, 1995: 505.

MATERIAL. Holotype ♂ (TMB) and paratypes 2 ♀♀ (TMB & SMF), MONGOLIA: " *Bulgan* aimak, 11km W Somon Bajannuur, am Südrand des Sees Bajan nuur, 1000m, Sandsteppe, zwischen *Caragana* und *Lasiagrostis,* Barber-Fälle, 14.6–24.8.1968 (Z. Kaszab, Nr 958)".

DIAGNOSIS. Males of this new species are most similar to those of *P. pinipumilis* from which they can be distinguished by inclined clypeus forming kind of rostrum (almost vertical in *P. pinipumilis*), spine-like outgrowth of paracymbium and shape of epigyne with subdivided upper part of fovea.

ETYMOLOGY. Specific name refers to the type locality, Mongolia.

DESCRIPTION. Male carapace 0.58 long, 0.21 high. Cephalic part higher than thoracic (Fig. 47). Clypeus in-

clined. Male palp as in Figs 43–46. Palpal patella 1.5 times longer than tibia and as long as cymbium, tibia lanceolate, pointed, paracymbium with small spine. Embolic division S-shaped with spine like embolus proper. Epigyne as in Fig. 48, with triangle-shaped opening, upper half of fovea divided.

COMMENTS. Description is based on figures made by J. Wunderlich. It is possible that female is not conspecific with male and may belong to *Semljicola latus* (Holm, 1939) [cf. Fig. 10e, in Saaristo & Eskov, 1996] known from adjacent Tuva.

ACKNOWLDEGEMENTS. We are grateful to late Michael I. Saaristo (Turku) for valuable discussions, to Veikko Rinne (Turku) for help in practical work and to Jörg Wunderlich for giving us his figures of the Mongolian species. This work was supported in part by INTAS grant # 05-1000008-8224.

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